

Focus Paper 1 – WHAT IS UNIQUE ABOUT SMALL SCALE CONTINGENCY (SSC) ANALYSIS?

A paper for NATO SAS panel 027
by Andrew Caldwell, CDA, DERA.
This paper draws in part on work
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1.0 INTRODUCTION

This paper has been commissioned by the NATO SAS-027 group that was recently established to examine the analysis of Small Scale Contingencies (SSC). The aim of the paper is to identify the differences between SSC analysis and existing operational research activities.

For reference SSC are characterised as low density, low (military) casualty operations involving 100,000 personnel or less. Peacekeeping, peace enforcement, humanitarian aid, counter-insurgency, military aid to civil authorities and national evacuation operations are examples of SSC.

For the basis of this paper SSC analysis is compared directly with the analysis of Major Theatre War (MTW). MTW are characterised as high density, high intensity war-fighting operations involving 100,000 or more personnel with the potential to generate significant casualties. It is also important to note that SSC may be considerably more protracted than MTW operations.

The paper is split into the following topics:

- 1) Foundations
- 2) Stakeholders
- 3) Measures of effectiveness
- 4) Scenarios
- 5) Techniques
- 6) Data
- 7) The future of SSC analysis

2.0 FOUNDATIONS

There are significant differences in our capabilities to analyse MTW and SSC. For MTW we have conducted analysis for over 60 years and have developed a wide range of validated tools and techniques.

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In contrast for SSC we have only seriously attempted to analyse this area for 10 years and the majority of our tools and techniques are still in development.

Because the foundations for SSC analysis are relatively under-developed (at least compared to our MTW foundations) we still have a long way to go. For example, in MTW the relationship between direct fire assets and indirect fire assets is understood, as are the roles of engineers, signallers and logisticians in contributing to campaign success. This allows us to examine the effectiveness and contribution of individual elements or to examine the synergy of the whole force. Analysis and practical experience have shown us that these elements, when working together, will lead to success on the battlefield.

For SSC, however, we are still in the process of cataloguing the elements required for successful completion of an operation as well as examining how they combine to provide that success. A force 'optimised' for SSC should contain a military-civil balance, possibly including judges, lawyers, economists, police, civil servants and health workers. These elements immediately fall outside the system boundaries that we have developed for MTW and there is therefore currently very little understanding within our community of how they operate, or of how we should combine them with military forces to produce campaign success. Furthermore, for the elements we do model in MTW we often find ourselves using them out of role in SSC.

Without a developed understanding of the civil-military balance in SSC it becomes difficult to examine the full scope of an operation. In many ways it is the equivalent of analysing MTW with only a partial understanding of how artillery or air power operates. It is of course possible to examine some aspects of SSC without this knowledge but the understanding of campaign success is dependent upon the synergy of all the elements. Therefore, it may take some time to answer with confidence the big question, "how do we 'win' in SSC?".

Despite the difficulties that we face in examining SSC it is interesting (and important) to note that the answering of SSC questions is placed firmly at the feet of military analysts. It could equally be handed to other government departments as several of them are also stakeholders in the success of SSC operations.

It is probable that we have ownership of the problem because the military can conduct activities in SSC that civilian agencies (normally) cannot. The military can respond quickly, they can deploy overseas, they can be self-sustaining, they can deploy in sufficient numbers to influence the situation and they have the capability to use lethal force to protect themselves and others against violence. They have many other characteristics that also make them suitable, such as flexibility and an effective command system. We must also not forget that owning military forces involves accepting a sunk cost and that in the absence of the threat of MTW the military should be available to take on additional tasks¹. Finally, the deployment of a significant percentage of the military overseas will not disrupt government services, in contrast to other government departments, which are often fully committed in their home country.

As long as SSC questions remain the responsibility of defence ministries and departments it suggests that there is an implicit assumption at the highest levels of government that the military is vital, possibly the most important and certainly the most suitable component to tackle SSC operations. Although the skills of the military do not encompass all the requirements for making SSC succeed they can often improvise with the resources at their disposal. Additionally, they are a vital and important part of the solution, bringing with them capabilities not available from other government departments or international organisations. Given the importance of the military in SSC it is probably inevitable that answering SSC questions will remain our responsibility for the foreseeable future.

¹ This is a simplification, as it can be argued that by using our conventional forces for SSC we weaken our response time and training opportunities for MTW, incurring a risk that we may not be able to deal promptly with unforeseen MTW threats.

3.0 STAKEHOLDERS

Already we have established there is a greater number of stakeholders involved in SSC than in MTW. Identifying them, and the influence they have on the analytical process is, however, problematic. For analysis of MTW there is an implicit assumption that the success of the military campaign is either the most important part of the operation or takes precedence over other considerations. Under circumstances where a nation state is directly threatened with MTW, humanitarian and social issues become (at least historically) secondary for the duration of that threat. So in MTW there are still humanitarian, social, political and economic issues but the influence of the stakeholders who deal with these issues is diminished or directly tied into the success of the military campaign.

In SSC there are always alternatives to the application of military force. In fact, although military forces are deployed, the direct application of those forces in an offensive combat role should be avoided, if at all possible. In SSC the drivers may be humanitarian or social and it is the application of force that becomes secondary. Stakeholders with alternate viewpoints, strategies and priorities have a voice at the highest levels of government for SSC whereas they have had little influence in MTW. It is at this point that our analysis of SSC may fail in the most significant way. The majority of our analysis is delivered eventually, in one form or another, to the most senior decision-maker in the defence ministry/department. To make our analysis meaningful and useful we ensure all the stakeholders below the senior decision-member are comfortable with and accept the validity of our results. This informing and smoothing process is an integral part of good analysis. Not only do we have to ensure the analysis informs the customer, but that it also informs all the stakeholders who may influence the customer.

But in SSC some decisions are made one or two levels above the senior decision-maker in the defence ministry/department, typically at the senior political level² as SSC are inherently political in nature. Because this decision encompasses the stakeholders from other government departments any analysis conducted within the defence ministry/department is unlikely to have been exposed to the other stakeholders (and vice versa). This can handicap our direct customer, the senior decision-maker in defence ministry/department, as they may find themselves using analysis that none of the other stakeholders are aware of or have bought into. Furthermore, analysis conducted without due regard for the other stakeholders is also unlikely, given the scope of SSC operations, to cover the measures of effectiveness (MOE) that they are interested in. MOE regarding military effectiveness and casualties may not be sufficient to judge the political cost of an operation in terms of votes, the financial burden of the operation or the implications for foreign policy. For the analysis to be meaningful and useful it must recognise that the final customer is the government and not just the senior decision-maker within the defence ministry. For us to deliver our analysis at a higher level we must broaden the scope of the work to inform all the stakeholders who can influence the final decision.

4.0 MEASURES OF EFFECTIVENESS

In MTW there is a very definite distinction between success and failure, with only a small grey area of uncertainty. The clarity of our definitions for victory or defeat depends very much on the Measures of Effectiveness (MOE) that we apply to MTW analysis. Aims, MOE and end-states are intrinsically linked and not only are MOE well understood for war-fighting but so too is the linkage between aims, MOE and outcome.

In SSC the aims can, on occasion, be uncertain. Even where the aims are known there can still be competing issues, none of which is dominant enough to simplify the system boundaries to allow us to examine only a few MOE. For example, is the aim of an operation to provide long or short-term assistance? Will the permanent commitment of troops to the SSC be acceptable? Where these aims are

² Cabinet office for the UK.

vague we are forced to consider a large selection of MOE to ensure we can target our analysis at a range of end states.

An added complication is that there are often political and geo-strategic aims associated with SSC. This affects the acceptable end-state and causes almost identical situations to receive vastly different responses, ranging from full-scale deployments to no action at all. Also, the publicly stated aims of an SSC may not be the only MOE by which the stakeholders judge the success of the operation. These supplementary MOE need to be identified and analysed in a manner that informs the stakeholders but does not expose them to undue public (or private) criticism. These sensitivities may delay the development of SSC analysis as we may not yet be answering the right questions because some stakeholders are over cautious or unable at this juncture to declare all their interests in SSC operations.

The haziness of aims and end states is further complicated by the types of MOE we can apply and the thresholds at which they are assumed to have been met. MOE in MTW are measurable because they are based on physical processes that are supported by hard sciences such as physics, chemistry and mathematics. The derivation of MOE in SSC is however much softer, relying on human issues more than physical processes. Psychology and sociology can provide some foundation but our understanding of, for example, coercion falls significantly short of our understanding of combat. For combat we can rely on physics and chemistry to give us, for example, the effective penetration of an anti-tank round against armour (given a working knowledge of a few parameters such as range, armour composition and thickness). But in SSC the factors that drive coercive MOE are less well understood and cannot always be quantified with hard OA. More often than not we are dealing with intangibles. This leads to subjective rather than objective MOE, and can adversely affect the confidence the customer is willing to place in our analysis.

Complicating further the application of MOE in SSC is our lack of understanding of the thresholds at which those MOE deliver acceptable end states. For example, in MTW historical research and operational experience has given us a good understanding of what casualties a unit can suffer before it loses its operational capability. These 'defeat levels' are a good example of a threshold at which MOE can inform the analyst that they have reached an end state. But in SSC the end state thresholds, even where they could be measured, have not been identified. For example, what are acceptable thresholds for the provision of humanitarian aid? Half the current death rate for the region? A death rate as low as a developed country or no civilian deaths at all?

Although the identification, quantification and linkage of MOE to aims and end states is a complicated area it is important to state that the main problem we face as analysts is that we do not yet understand how to simplify the system. This is fundamentally more important than trying to understand and model every aspect of SSC (which the complicated SSC environment drives us to attempt). We can analyse MTW because we make many apparently justifiable assumptions about the nature of MTW that simplify or ignore many real world processes. As we discussed earlier the military campaign dominates the political-military processes in MTW. We also know how to aggregate low-level analysis into high level systems. Because of these factors we can simplify the system boundaries for analysis and this is the precursor to modelling any real-world environment economically and quickly. Unfortunately, we do not know enough about SSC at the moment to determine which processes are important and which can be ignored or simplified.

However, recent history has begun to indicate that these types of assumptions may no longer be valid even for MTW. Fear of NATO casualties significantly altered the options open to the allies in the Operation Allied Force. We are still engaged in the Gulf, 10 years after the formal cessation of hostilities. Human factors such as coercion and morale, played a large part in the success of the coalition's operation to liberate Kuwait. Collateral damage inflicted on a civilian-occupied bunker in Iraq during 1991 permanently affected the target list for the rest of the campaign.

In light of this we have to ask ‘does this matter’? Historically the answer was no, because the analysis was robust enough to answer the question of the day. In the future though it may make a difference and we may have to begin removing many of the convenient assumptions we have used for six decades about MTW. The advantage with MTW is that at least there is a firm foundation on which to build further understanding. If at the same time we are trying to simplify the system boundaries of SSC analysis there should come a point where the two tool sets will meet.

This leaves another option for the development of MOE in SSC. By building some of our understanding from the bottom up, based on MTW analysis techniques and MOE, we should eventually reach a state where we can incorporate this work into the SSC tool-set. As an example, coercion in MTW may be no different, fundamentally, to coercion in SSC. If this is the case we should endeavour to make sure we do not expend scarce resources on doing the job twice and that we should identify whether such analysis should begin in SSC or MTW, in the knowledge that it will eventually inform the other group.

5.0 SCENARIOS

Most MTW analysis is conducted within the context of a scenario. The term scenario covers a wide range of examples that can, for instance be generic, specific, theatre wide or simple vignettes. Even if the analytical process does not rely directly on the scenario the final results are presented within the context of at least one scenario. For example, calculating the optimum range and fuel capacity of a next generation helicopter may not require any specific scenario inputs. But for the conclusions of that analysis to be meaningful the stakeholder must understand how the analysis compares with the likely scenarios or operations in which the helicopter will be used.

There are fundamental differences between scenarios developed for SSC and MTW and most defence ministries/departments have recognised this problem by developing SSC-specific scenarios. As scenarios are often a tangible expression of policy they are likely to be conservative (rather than radical) in nature. Because of this scenario development often relies on historical operations for context, and in this respect the development process for SSC scenarios should be easier than in MTW, as there is a wealth of SSC operations in recent history on which to build.

The first area of concern is if those SSC scenarios developed solely within the defence ministry/department. Typically, where this is the case, they are used for testing the capabilities of military equipment, doctrine and tactics. The prescribed end states associated with the scenarios are concerned with the performance of the military elements. This is understandable and indeed desirable as there is little incentive to conduct analysis on part of an SSC that does not directly inform a procurement process or an internal defence policy issue.

However, where this limits our analysis is that the results are unlikely to be applicable to the wider stakeholder group. Conversely, other government departments may have their own scenarios that deal solely with their processes and ignore the military contribution. When the stakeholders meet they have each developed their own understanding of how an SSC should be tackled with a departmentally centric view. Each set of analysis (if there is any at all) is unlikely to show the appropriate interactions between the military and other actors involved in SSC. For example, the military analysis may suggest that the purchase of additional resources is required to enhance their capability to support future SSC operations. If another government department’s analysis suggests that those resources can be hired in theatre and need not be procured in advance then there is a conflict of interest between the stakeholders on which department should have responsibility and funding to cover that aspect of SSC. Such conflicts of interest should be addressed in the analysis stage and not at the final executive decision making stage.

Examining the military parts of SSC scenarios, when compared to MTW scenarios, reveals several fundamental differences in their composition. One important one is that there may be a less predictable

range of threats to the SSC force. There are two aspects to this. First, there may be multiple actors involved in SSC whose relationship with the SSC force is unknown. This leads to uncertainty of who the adversaries may be. Secondly, even for those actors that are known to be potentially hostile there may be no accurate way to calculate the threat. This is because in MTW we assess the numbers and capabilities of equipments in the knowledge that any potential opponent has the will to use all those equipments to their full potential. In SSC, although we can still assess the numbers and capabilities of equipments that our potential adversaries may possess, we cannot assume they have the will or motivation to bring the full potential of that force to bear. Often this is because we are not their principal opponent and that there is at least one other faction in the theatre that they are more concerned with. Therefore, for the analyst it is often hard to quantify a realistic threat level to any SSC force. This can lead to an over-estimation of the force protection required in relatively benign environments. Immediately that constrains our analytical results to advice on what may be a robust force (with considerable redundancy) as opposed to what is an optimal force.

Another difference in SSC scenarios is that there are additional constraints on the use of military force that need to be incorporated into the analysis. Some examples are Rules of Engagement (ROE), limits on collateral damage and our own and others' casualty levels. In respect of casualties the thresholds that are considered acceptable for SSC are presumed to be significantly lower than MTW and a single incident may be sufficient to push casualty levels over that threshold (e.g. Somalia). In war we can aggregate many separate incidents into high level analysis because statistically casualties will average out, from incident to incident over the course of the battle. In SSC there are fewer incidents and their frequency is reduced. This makes it harder to justify the averaging out of casualties (per incident) in SSC and drives us to model each incident in detail. This significantly increases the factors we need to consider in SSC and reduces our scope for simplifying the system boundaries.

Finally, in SSC military elements within the theatre of operations itself are more dispersed than in MTW. There is no front line or rear area and often there are only pockets of our forces, intermingled with allies and potential opponents alike. As the majority of our tools and techniques for MTW are based upon doctrine that assumes (in its coarsest sense) front lines and rear areas it immediately renders a large proportion of our MTW tool-set inappropriate and unsuitable. A new tool-set, incorporating SSC specific doctrine, environments, tools and techniques is therefore required.

6.0 TECHNIQUES

Having talked at length about scenarios it is necessary to talk briefly about the analysis techniques themselves. We have already mentioned some of the factors that hinder the analysis of SSC. In summary:

- We do not have a good enough understanding of human factors such as perception. Simple 'force on force' scaling is not appropriate.
- We do not have a full understanding of aims, end-states, MOE or the thresholds that differentiate success from failure.
- The system is complex because critical MOE (such as casualties) can only be modelled effectively at low level but other MOE (such as whether the region has been stabilised or not) must encompass an examination of the whole theatre of operations at the Grand Strategic level.
- The requirement to include new stakeholders further increases the size of the analytical task.

In addition to those factors we can now add some additional complications. The command and control system in MTW can be simplified into one network. It is not yet known if this approach is valid for SSC. In SSC quite often we will be looking to measure a null effect. For example, if a convoy is under escort there are two potential MOE: the first is whether the escort can defend the convoy against an attack;

and the second is whether it deters an attack in the first place. The first is easy to measure, the second is not because it relies on an understanding of human factors such as fear, hatred and perception. Unfortunately, the thresholds for other MOE, such as casualties, mean that the second measure is the more important one, as successful deterrence produces less casualties than a successful defence. Finally, in MTW analysis the use of only a few scenarios is often sufficient to test every element of the force pool. In SSC, some scenarios call for only a limited deployment and a large variety of scenarios need to be employed to fully test each element of the force pool. This is not complicated but does place an additional financial burden on producing an all-encompassing SSC analysis programme.

There are however some potential benefits in the analysis of SSC that are not open to us in the analysis of MTW. Stockpile analysis for a wide variety of war-fighting materials is unlikely to be required. Although specialist, low density, high utility components (such as UAVs) may still need to be examined, the draw down on logistics is more likely to be confined to fuel, water and food at constant rates. Detailed weapon analysis may not be required as the threat is unlikely to be more sophisticated than our potential adversaries in MTW, from which detailed weapon system parameters, capabilities and performances will have already been calculated. Modelling of air to air combat or surface naval engagements may also be unnecessary, simply because there may be no significant threat in these domains and some analysis areas, such as ASW, may not be required at all because of the lack of any applicable threat. Finally, some techniques, such as decision tree analysis, may be particularly powerful for examining SSC operations due to the smaller number of incidents in SSC than in MTW. Although decision tree analysis cannot guarantee an optimum solution it can provide insights on how to avoid some of the more unpalatable outcomes from engaging in SSC operations.

7.0 DATA

To support the techniques we have available (or that we will develop) for SSC we need data. We have collected and analysed data for MTW for over 60 years, focusing on specific requirements. Our SSC data collection and analysis is probably only 10 years old and at present not focused on specific data types but on a wide coverage of many different types of data for the operations we are or have been involved in.

There are two advantages we have in collecting data for SSC as opposed to MTW. The first is that we almost always have forces committed to SSC, so at any given moment there is likely to be a live operation from which to collect data. The second advantage is that there is more time for the forces (or analysts) in theatre to collect the information. MTW can be a chaotic and fast moving environment, where there is often inadequate time to collect data during the operation or to preserve them before they are destroyed for operational security. The slower pace of SSC operations gives us a greater window of opportunity to have direct access to real-world data.

There are of course disadvantages. First of all, we have not identified which data are important and which are not. Unfortunately we need to collect a lot of data before we can identify which items are important. This requires manpower to conduct data mining but until significantly greater funds are set aside for SSC analysis this activity will have to wait. Secondly, we do not yet know how to model the impact, role and affects of other organisations such as the World Bank, the UN, NGOs or the belligerent factions in SSC operations. As stated earlier SSC require a civil-military balance as social, humanitarian and long-term stability issues affect the end states of an operation. Without a more developed knowledge (within our community) of how these organisations function and exert influence we cannot be certain that we have access to or have collected the correct types of data to model them effectively. Thirdly, some data may be politically and/or operationally sensitive while we are dealing with live operations. It may not be possible to gain access to this information or to share it with our allies for some time. This in itself will not stop the development of SSC analysis techniques but it may hinder the rate at which we can develop. Finally, a larger amount of data is required to adequately address the large number of variables in SSC. This again carries with it a cost burden.

There are other considerations for data collection. It is likely that a greater proportion of the data that we will need to collect will deal with human issues (e.g. coercion). Such data are more subjective, often represented by surrogate indicators and are therefore hard to quantify with confidence. Learning how to incorporate and make sense of this type of data may be a significant undertaking in itself. This type of data is also less likely to be recorded and recent historical analysis suggests that anecdotal SSC data is less reliable than anecdotal MTW data, further hindering accurate collection. There is also the likelihood that some factors will be ethnographic or cultural. This may render the data case specific, which again increases the volume we have to collect to support our analytical processes while depriving us of a generic data-set for the examination of human issues.

All these factors constrain us on what it is possible to achieve but it is not impossible. There is a wealth of data out there (including the colonial histories of some European countries which in many ways mirror aspects of SSC) but the barriers to effective data collection and application require a significant change in the way SSC analysis is funded. There is insufficient effort, NATO wide, to draw out the key data for SSC analysis within a reasonable time frame.

8.0 THE FUTURE OF SSC ANALYSIS

It is possible, but by no means certain, that concurrent SSC may eventually become the principal force structure driver for several NATO members. Canada is a good example where this conceptual change is already occurring. Even if only a few NATO members move in this direction it should follow that the analysis of SSC should gain in importance, not just among those members but amongst the community as a whole. We must after all understand how to operate as a coherent alliance in SSC operations and doctrinal, tactical and equipment changes implemented by one nation must be understood by all. Without that understanding there would be strong implications for role-sharing and compatibility between NATO members, not just in SSC but in MTW as well.

The main constraint we face is financial. Our MTW analysis is based upon 60 years of effort with a firm financial and scientific foundation. In comparison we have conducted SSC analysis for only 10 years and we have yet to build satisfactory foundations from which to tackle the issues highlighted in this paper.

The main areas where we need to concentrate our resources are:

- 1) Identify the stakeholders and their priorities in SSC and include them, where appropriate, in the analytical process.
- 2) Simplify the SSC system boundaries to make the problem manageable, even if in the early stages that analysis has to be heavily caveated.
- 3) Identify common areas in SSC and MTW that will need to be developed in the near future (e.g. collateral damage). Once identified we should decide for each area of development whether it should be tackled from firm MTW foundations or from a simplified SSC system.
- 4) Increase our understanding of SSC aims, MOE and end states, their linkages to one another and the thresholds that separate success from failure.
- 5) Increase our understanding of human factors in SSC and the techniques we can use to analyse them.
- 6) Continue to develop our understanding of SSC scenarios, tools and techniques and identify whether existing MTW techniques can be used for SSC. From this position a basic SSC tool-set (which may require new tools) can be identified.
- 7) Identify, collect and process the key data items required to support a basic SSC tool-set.

In the final analysis it could be argued that MTW is a simplified sub-set of SSC, where judicious use of assumptions has removed the major barriers to analysis. As policy makers become increasingly concerned with the humanitarian, political, social and the long-term impacts of MTW, understanding the barriers may become as important as delivering the analysis. Given that SSC is a much more complicated problem it is reasonable to suggest that we cannot expect to become experts in this field overnight. However, we must not forget that providing SSC analysis is likely to remain the responsibility of our community and that given the right circumstances we can succeed.

